भारतीय मानक
Indian Standard

IS 15883 (Part 11) : 2021

निर्माण परियोजना प्रबंधन — दिशा-निर्देश

भाग 11 सततता प्रबंधन

Construction Project Management — Guidelines

Part 11 Sustainability Management

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भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुरशाह ज़फ़र मार्ग, नई दिल्ली – 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI-110002
www.bis.gov.in www.standardsbis.in

March 2021 **Price Group 6**

Construction Management (Including Safety in Construction) Sectional Committee, CED 29

FOREWORD

This Indian Standard (Part 11) was adopted by the Bureau of Indian Standards, after the draft finalized by the Construction Management (Including Safety in Construction) Sectional Committee had been approved by the Civil Engineering Division Council.

A construction project is an endeavor undertaken by a project team on behalf of owner/client to create a built facility suited to the defined functional objectives. From inception to commissioning, the project goes through various distinct stages leading to progressive achievement of project objectives. Each stage involves specific inputs, processes (both technical and managerial) and deliverables. Typically, the life cycle of a project from commencement to completion involves the following stages:

a) *Project appraisal* — Inception, feasibility and strategic planning;

b) *Project development* — Project brief development, planning and design, finalization of proposals, procurement strategy, construction documentation including tender drawings, construction drawings, specifications, cost estimates, bills of quantities, procurement documents;

c) *Planning for construction* — Sequencing of project components, planning tools, resource planning and time cost trade off;

d) *Tender action* — Open competitive bidding/pre-qualification of agencies, issue of tender documents, evaluation of bids, negotiation, if required and award of work;

e) *Construction* — Execution, monitoring, control, work acceptance; and

f) *Commissioning and handing over* — Contractual closeout, financial closeout, defect liability commencement, facility handing over.

The distinct features of a construction project include the temporary nature of the project team involved, the evolutionary process of project deliverables during project development stages and the unique output as the built facility. As a result of these features, unless there is efficient and effective project management, a construction project is faced with challenges of uncertainties leading to time overruns, cost over-runs, changes in project parameters, loss of quality and inability to meet the functional objectives. While technical soundness of a proposal is an important aspect of a construction project, the management aspects, which involve techno-legal, financial and other issues, have also a significant role in the success of a project. Therefore, management functions and technical processes in a construction project need to be integrated towards achieving project objectives. Top management commitment plays an important role in harmoniously achieving these project objectives. In some of the public domain projects, it may be necessary to share relevant information with public at large through appropriate means.

To provide necessary guidance on effective construction project management, a series of standards are being developed as part of IS 15883 'Guidelines for construction project management'. Part 1 General, of the standard since published as IS 15883 (Part 1) : 2009, covers general aspects of overall construction project management. This standard has been followed by publication of other parts as follows:

Part 2	:	2013 on Time management
Part 3	:	2015 on Cost management
Part 4	:	2015 on Quality management
Part 5	:	2013 on Health and safety management
Part 6	:	2015 on Scope management
Part 7	:	2020 on Procurement Management
Part 8	:	2015 on Risk management
Part 9	:	2018 on Communication management
Part 10	:	2020 on Human resource management
Part 12	:	2016 on Integration management

(*Continued on third cover*)

Indian Standard

CONSTRUCTION PROJECT MANAGEMENT — GUIDELINES

PART 11 SUSTAINABILITY MANAGEMENT

1 SCOPE

1.1 This standard (Part 11) covers guidelines for sustainability management aspects of construction project management.

1.2 The sustainability project management aspects considered in this standard include the stages subsequent to the stages of approval (when a decision to implement the project including its financing is taken) till commissioning and handing over the project.

1.3 The provisions of this standard shall be read in conjunction with IS 15883 (Part 1) and SP 7 (Part 11).

2 REFERENCES

The standards listed below contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
7337 : 2010	Glossary of terms in project management (*second revision*)
10400 : 2013	Glossary of terms in inventory management (*second revision*)
15198 : 2014	Glossary of terms in human resource development (*first revision*)
15883	Construction project management — Guidelines
(Part 1) : 2009	General
(Part 10) : 2021	Human resource management
SP 7 (Part 11) : 2016	National building code of India 2016: Part 11 Approach to sustainability

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 7337, IS 10400, IS 15198 and the following shall apply.

3.1 Embodied Energy — Total of all the energy consumed in the processes associated with the production of materials and products.

3.2 Environmental Impact — Impact to the environment, wholly or partially resulting from environmental aspects.

3.3 Non-renewable Resource — Resource that exists in a fixed amount that cannot be naturally replenished or cleansed on a human time scale.

3.4 Renewable Resource — Resource that is grown, naturally replenished or cleansed on a human time scale.

3.5 Reuse — Operation by which products or components are used again for the same purpose for which they were conceived.

3.6 Recycling — Recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes.

3.7 Sustainability — State of the global system, including environmental, social and economic aspects in which the needs of the present are met without compromising the ability of future generations to meet their own needs.

3.8 Sustainable Development — Development that meets the environmental, social and economic needs of the present without compromising the ability of future generations to meet their own needs.

3.9 Waste — Substances or objects which the holder intends or is required to dispose of.

4 GENERAL

4.1 Context

Sustainable development is key to tackling the linked challenges of climate change, resource use, economic prosperity and social well-being, and cannot be achieved without sustainable construction.

Sustainable construction bears upon developing the design proposal, which is efficient in terms of functional performance as well as detailed out to ensure that the material resources and construction technologies are used efficiently during construction stage. Frequent changes to the design during construction stage often lead to wastage and other resources, rework, and redundant handling and construction processes. Construction practices to execute design proposals, which inherently cause higher wastages and do not facilitate efficient planning should be avoided.

4.2 Principal Objectives

Following are the principal objectives of sustainability management:

a) Minimizing adverse environmental impact of construction activities, products and services.
b) Limiting any adverse impact within the laws/ prescribed norms and their monitoring.
c) Protection of environment while working with hazardous material.
d) Reduction and management of disposal of waste from construction sites.
e) Considering positive environmental contribution.
f) Developing system and procedures for achieving sustainability objectives.
g) Putting in place systems to minimize damage at site due to natural and man-made disasters.

4.3 Steps to Achieve Objectives

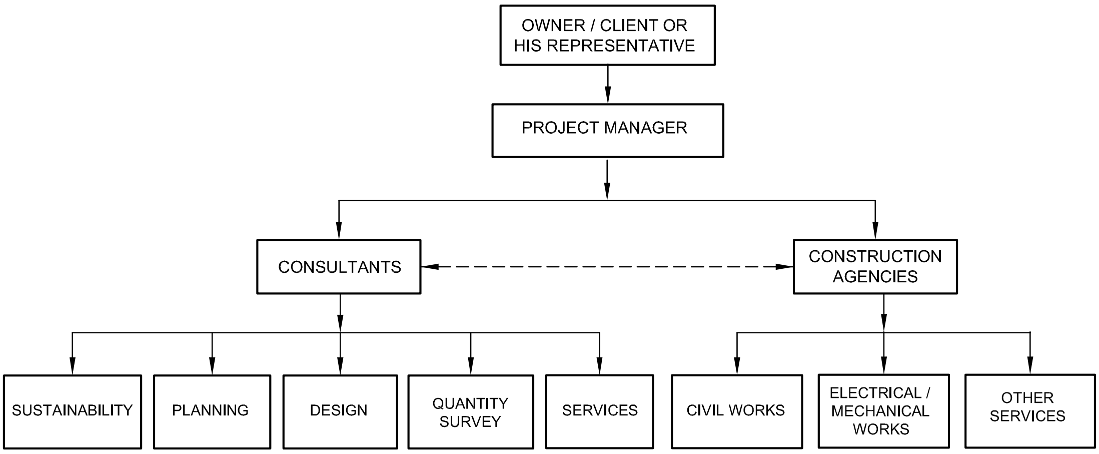
The objectives given in **4.2** define the scope of the environmental management of the project site, and a framework for the project manager to determine the environmental aspects of the activities, products and services. To achieve these objectives, it is required to identify the following aspects of sustainable development on project site by adopting a structured methodology at different stages of the construction process:

a) Identification of issues at project planning and designing stages;
b) Identification of issues at pre-construction stage;
c) Identification of issues during construction stage;
d) Preparation of sustainability construction management plan; and
e) Implementation and monitoring of sustainability construction management plan.

The social and environmental impact assessment of the project need to be undertaken depending on the type and size of the project and as per the statutory guidelines.

4.4 Organizational Structure

Establishing site organization structure, considering management systems and involvement of other agencies in construction, is very critical. Interfaces across various agencies involved in construction need clarity for effective coordinated decisions which can lead to prevention of wastage of resources, reworks, rejections, delays and such other non-conformities detrimental to quality of work and delay in execution. As an example, a typical organizational chart for sustainability management in a design-bid-build model is given in Fig 1.



NOTE — 'CONSULTANTS' MAY COVER IN-HOUSE TEAMS OR OUTSIDE CONSULTANTS

FIG. 1 TYPICAL ORGANIZATION STRUCTURE FOR SUSTAINABILITY MANAGEMENT IN DESIGN-BID-BUILD MODEL

5 SUSTAINABILITY MANAGEMENT IN CONSTRUCTION

5.1 Identification of Issues at Project Planning and Designing Stages

5.1.1 *Planning and Design*

The project planning should be detailed out so that use of materials and technologies may be planned in advance. Design detailing should facilitate planning of procurement of materials in sizes, volumes and lots, such that the wastage during construction is least. It is desirable that the design is consistent with the available material sizes, shapes, volumes and local or regionally sourced material. Design should, therefore coordinate to incorporate quality and quantity aspects from the point of view of construction.

5.1.2 *Inclusion of Sustainable Construction Needs*

5.1.2.1 *Elements of sustainability*

The generalized design process towards sustainability should creatively address the following considerations:

a) Set the design parameters to be equal to or higher than benchmarking standards as prescribed in SP 7 (Part 11).
b) Make the basic performance requirements and set standards, applicable/selectively adaptable to the climatic zone and geological conditions in which the construction is proposed.
c) Address requirements of performance and human comfort, considering development type and use, quality of building and plumbing services desired, etc, in a building and its surroundings.
d) Question the need, identify their optimum levels in long term scenario, and take the design and construction provisions to that level only.
e) Ensure what is sustainable today, remains that way in decades to come during the service life of the structure and ensure the required performance levels of systems designed.
f) Ensure that sustainability is perceived as a holistic effort.
g) Make efforts to maximize the use of traditional wisdom in design, and construction.
h) While having an open approach, assess new materials and technologies for their long-term impact in the context of the location of the project.
j) Take decision making processes to measurable levels in order to make judicious choices.
k) Take the savings' benchmark targets closer to the minimum consumption standards; undertake value engineering exercises for deciding among the options.

This process emphasizes the requirement of bottom up approach which invariably considers microclimatic, social and cultural conditions around.

NOTE — The 'bottom up approach' concentrates more on how little is consumed, pursue deep understanding of sustainability, uses low technology innovations, materials and practices, recognizes performance to be more important than intent; and necessitates the use of common knowledge and common sense in design decisions. On the contrast, the 'top down approach' concentrates more on how much energy is saved, accepts the understanding of sustainability may not be developed indigenously more readily, uses high technology innovations, materials and practices, is driven by green brand and accompanying recognitions based on intent; and necessitates expert inputs and simulations.

5.1.2.2 *Life cycle sustenance*

The process flow from concept, design, construction, commissioning, operation and maintenance, and also decommissioning and disposal at the end of useful life of structure, should be planned and important steps chalked out for sustainable development. This should also take care of possible reuse/recycle of materials/components/structure or parts thereof. Ideally close the loop (cradle to grave) with regards to resources originally used.

5.1.2.3 *Technology options*

Technology options shall be a combination of natural and manmade materials with least embodied energy and use of rapidly renewable resources to be implemented. The trade-off between choice of the materials and technologies and their effect on environment has to be balanced with the aim of a closed-loop system. As a holistic approach, all efforts should be made towards:

a) Encouraging and harnessing building materials out of agricultural, industrial and bio-wastes.
b) Encouraging indigenous environment-friendly and acceptable cost-effective technologies and practices in identifying and pursuing sustainable developments amenable to local, cultural and resource diversity.
c) Making building construction more indigenous, more adaptable to local climatic zone and executionable to achieve the basic provisions for sustainable development to ensure sustained availability of building resources through regeneration and/or reuse/recycle.
d) Encouraging use of traditional materials, technologies, local vernacular design and construction practices.

5.1.2.4 *Reduced embodied and operational energy*

All designs, materials and technologies, construction practices should be selected and employed aimed at reducing the overall embodied and operational energy involved in construction and operation of the built facility. The construction should promote local sustainability through adoption of local resources (natural and man-made) and local skills.

5.1.2.5 *Stakeholder commitment and involvement*

All stakeholders shall be involved in the training and awareness to pursue and achieve needs for, sustainable development at all stages of building lifecycle (from design to end of life). The environmental impact assessment should be carried out and remedial measures based on the findings should be taken during the life cycle of the buildings.

5.2 Identification of Issues during Pre-Construction Stage

5.2.1 *Preparation of Sustainability Construction Management Plan*

Having identified sustainable issues specific to the project, a comprehensive planning needs to be documented in a management plan. The management plan documents the approach to site management, project management processes, systems for management, site organization, data inputs to determine effectiveness of management systems and site planning.

5.2.2 *Site Planning*

Improper site planning is often reason for redundant material handling, processes involving unnecessarily long lead, wastage during multiple handling, inefficient deployment of equipment, etc. Circulation and movement of workers and visitors can be reason for unsafe working conditions. Following issues, therefore, need specific attention while undertaking site planning:

a) Layout of roads and services;
b) Movement and deployment of plants, equipment and machineries;
c) Location of temporary structures, fabrication area and storage areas;
d) Work area demarcation and safe surrounding;
e) Emergency plan and medical facility;
f) Control of derelict site or land;

NOTE — 'Derelict site or land' is a land that has become damaged by industrial or other development and beyond beneficial use without treatment.

g) Protection and management of top soil;
h) Storage of chemicals, fuels and explosives; and
j) Construction and demolition waste management.

5.2.3 *Location of Facilities for Hazardous Materials*

The facilities for storage of hazardous materials may be provided after considering all aspects. There may be a case for locating such facilities offsite. Specific statutory guidelines in respect of such requirements shall be referred to. The facilities and the handling procedures shall be well established.

5.3 Mitigation of Impact Due to Material and Technologies Deployed

Construction materials and technologies used at site may impact the environment, especially during processing of materials, such as cutting, mixing, fabrication, etc causing noise, dust and sometimes release of fumes. Such materials and technologies need to be identified and procedures planned to mitigate impacts.

5.4 Movement and Deployments of Plant and Equipment

Selection of efficient plants and equipment and their proper scheduling of operation are key considerations for sustainable deployment. While selection, it is essential to ensure that plants and equipment have their performance ensured not in isolation but also when considered in relation to the supporting plants and equipment. For example, the selection of excavator of a certain capacity is linked to the availability to earth transportation out of site and the clear working space available for the excavator and the transportation vehicles. Having selected an optimum set of plants and equipment, it is essential that their operation is scheduled such that their combined performance is maximized. Failure to deploy plants and equipment in an efficient and effective manner may result in undesirable loss of fuel, and noise and air pollution.

5.5 Contractual Obligation towards Sustainable Construction

Contracts determine obligations of individuals and organizations. In this respect, the contracts shall make it obligatory on the part of the supplier (materials, equipment or services) to follow sustainable practices and processes. Contractually binding obligations ensure system-wide responsibilities so that necessary mitigation of resources may be budgeted within the project scope.

5.6 The procedure to identify sustainability issues during construction, should include the areas of analysis given in **5.6.1** to **5.6.3** and other applicable concerns in respect of project scope and context of site and environment.

5.6.1 *Construction Methods Review and Impact on Sustainability*

Design details determine the construction procedures. It is desirable to prepare a construction methodology and review the same from the point of view of its impact on the suitability to achieve quality, control of wastages, safety, resource optimization, energy conservation, water use, site contamination and pollution.

5.6.2 *Consideration to Environmental Impact Assessment*

Environmental impact assessment (EIA) report systematically identifies the risks and impacts and recommends mitigation measures. Framework of EIA is defined in accordance with the statutory requirements and, hence, it is essential to consider the impacts so identified. Construction methodology and processes shall take cognizance of EIA report and environmental management plan (EMP). The EIA requirements are specific to the project undertaken.

5.6.3 *Identification of Training Needs and Workforce Development*

Sustainable construction practices require specific processes to be followed in respect of planning, monitoring and control. Involvement of workforce at all levels need training to deal with sustainability issues during construction. Project management functional responsibilities shall include identification of processes, competencies of persons involved in discharge of such duties, assessment of performance and conduct of training programme. The effectiveness of training programme shall be assessed through performance appraisal system and corrections made as needed. Training need assessment frequency should be determined based on the type of work and the human resource competencies. Reference should be made to IS 15883 (Part 10) for detailing out training schedules and requirements.

5.7 Establishment of Construction Project Management Processes

Objectives of sustainable construction can only be realized through effective project management processes. Time, cost, quality, scope, risk, procurement, human resource, health and safety are some of the basic project management processes that shall be elaborated. Reference should be made to IS 15883 (Part 1) for detailing out construction project management processes.

5.8 Establishment of Energy Consumption

Monitoring of performance of management systems and processes of execution need establishment of indicators so that specific improvements may be achieved. In this respect, energy consumption monitoring is fundamental. At construction sites, electricity and diesel are primary sources of energy and their consumption shall be monitored so as to improve methods and to ensure that the operation of equipment is energy efficient. Data collected should be analyzed with respect to processes of significance in terms of consumption and pollution. Database so generated can also be used for establishing project specific, organization specific or process specific benchmarks for future reference. Appropriate documentation of fuel consumption logs, energy metering and execution processes shall be planned and assigned organizational responsibility. Site management decisions shall take cognizance of energy consumption data.

5.9 Work Education Procedures

Work execution procedures should be described in a manner so that there is least wastage, rework and repair and acceptable performance is achieved. In this respect, the reference to relevant Indian Standards for materials; quality assurance verification; material handling, storage, and protection; work procedures including working on materials/fabrication, placing/installation; inspection and testing procedures of completed works; and protection after completion of work, need to be specifically addressed. In addition to these considerations, the relevant works should be given specific attention as given below:

a) *Excavation and sub-structure works* — Issues related to noise and vibrations during excavation, piling, rock cutting, etc; control of damages to surroundings; prevention of collapse; and, control of excessive dewatering and sustainable use of dewatered water need to be analyzed, risks identified and methodologies detailed out prior to undertaking such works.

b) *Concrete work procedures* — Soundness and stability of formwork and other enabling structures; suitability of concrete mix to the prevailing environmental conditions; avoidance to undesirable cutting, etc, for laying services and embedded items; providing requisite cover to the reinforcements; proper curing; and, allowance of setting time are essential for meeting the expected performance of concrete works. In general, for concrete works, good practices standards shall be followed.

c) *Steel, aluminium and other metal works* — Noise control during cutting, welding, hammering and fabrication operations; prevention of waste; reuse of cut sections (for example cut reinforcement bars reused in other locations depending on requirement); collection and disposal of scrap; fire and injury prevention during working; prevention of collapse due to unstable installation operations; and safety of workmen are critical aspects that need special mention in procedures.

d) *Masonry works* — Wastage during on-site handling of materials; execution in proper plumb, plane and alignment to avoid wastage of finishing material for making up for the defects; and, filling up of joints to attain requisite material thermal characteristics, impermeability and strength.

e) *Surface finishing and furnishing* — Preparation of finishing base; environmental conditions during and after finishing/furnishing works; and, application procedure for surface finishes are essential considerations to realize desirable surface characteristics as well as service life of finishes and furnishings.

f) *Handling and use of chemicals* — Working conforming to the prescribed procedures; protection against spillage and human body contact; supply and use of log describing quantities and authorized person(s); and, prevention of reaction which are explosive, exothermic causing fire or release of toxic fumes or creating corrosive reactions to the surrounding works, should be specifically identified and planned.

g) *Handling and use of oils and gases* — Avoidance of fire by preventing conditions leading to ignition; spillage polluting the works and sites; use of appropriate containers for storage and handling; and contingency procedures for limiting damage due to spillage and neutralizing the effects should be specifically highlighted in procedures.

5.10 Construction Waste Management

5.10.1 *Construction and Demolition*

Construction and demolition activities generate large quantities of solid waste. Diversion to landfill sites is one of the major issues in handling of construction waste. Increase in waste generation and improper land filling with construction wastes have major impacts, and like waste of land resources, affecting water bodies, ground water pollution. Construction organizations shall systematically pre-empt and identify wastes that may be generated and plan to reuse, recycle and handle wastes in an appropriate manner. Monitoring of waste and its disposal through an established procedure also create opportunities to prevent wastages in construction processes and lead to conservation of resources.

By proper disposal, waste materials which are likely to be dumped in landfills can be converted into value added products. Some construction waste materials can be diverted for re-use, whereas others can be recycled into another usable material. Many construction waste materials can either be used onsite or sent to other sites/industries for reuse/recycle/reconversion into useful products.

One of the important approaches to reduce waste and effect waste utilization is to evolve design details such as optimizing use of materials and employing technologies aiding in the same. Durable materials and high performance technologies need lesser maintenance and deliver better service life. Proper construction waste planning is, therefore, recommended before starting the construction or demolition which involves identification, segregation, proper storage, reuse/recycling and finally the proper disposal of remnant waste materials.

5.10.2 *Identification, Segregation and Storage of Waste*

It is very difficult and costly to reuse or recycle the waste materials which are in mixed form and not segregated at right time during the construction. Storing of segregated waste in labelled containers/bins, and monitoring of stored waste bins periodically by the trained/skilled personnel may prevent wastage. Waste should be stored within the site and such area should be chosen, where further shifting is not required.

5.10.3 *Reuse and Recycle*

Reuse and recycling not only reduces the land filling load but is also economical and an eco-friendly step in construction. Reuse increases the life of building materials. It is desirable to locate nearby recycling units for construction waste recycling to reduce the cost as well as adverse environmental impact.

Brick bats and concrete wastes have a potential to be used as sub-grade works for paving, etc. Excavated earth and boulders may often be reused at site or used elsewhere. However, topsoil should be isolated, preserved and reused at the same site or at another location where there is a demand for fertile topsoil for landscaping. Wastes, such as metal and plastics, should be disposed off for recycling. Other wastes, such as cellulosic materials and timber, which are biodegradable, should be disposed of at authorized designated locations.

5.10.4 *Handling and Disposal of Waste*

All construction wastes shall be stored or handled in such a way so as to avoid unnecessary decay or deterioration. Bio-degradable waste during construction shall be collected separately and treated with bio-methanation, organic waste compactors, etc or subjected to composting.

5.11 Planning, Monitoring and Control of Environmental Descriptors

Environmental impact assessment (EIA) undertakes characterization of the existing status of the land, water, air, biological and socio-economic environment in the project area and its surroundings. It seeks to identify potential environmental impacts of the project, and formulation of an effective environmental management plan (EMP) to prevent, control and mitigate the adverse environmental impacts, and ensuring the compliance with the environmental legislations. Thus, the scope for planning, monitoring and control of environmental descriptors during construction phase is identified and described in the EIA and EMP. Construction agencies shall develop further and detail out their respective compliance requirements accordingly. Depending on the nature of project, construction agencies shall be required to establish infrastructure and procedures for soil monitoring, water quality monitoring, ambient air quality monitoring, noise monitoring, tree counting and traffic survey, with a view to having required controls thereon.

5.11.1 *Soil Monitoring*

Soil samples from representative locations in the site and study area shall be collected and analyzed for important relevant physical and chemical parameters. Soil monitoring should be carried out at appropriate locations of the sites.

5.11.2 *Water Quality Monitoring*

Water quality monitoring shall be conducted at representative locations in the study area for surface and ground water. Samples shall be collected and analyzed for important relevant physical, chemical and bacteriological parameters. Water quality monitoring locations should include the appropriate surface water (if existing in the study area) and groundwater locations.

5.11.3 *Ambient Air Quality Monitoring*

Depending upon the project size, location and the type of activities involved, ambient air quality in respect of suspended particulate matter (SPM), respirable particulate matter (RPM), SO_2, NOx, and CO, shall be monitored at representative locations in the site and study area at a frequency defined by the statutory authority at each location. The monitoring locations shall be located on the basis of predominant wind directions, land use pattern and height of the proposed stacks. At least one station shall be located at the maximum pollution deposition area due to the proposed stacks of generators. The number of air quality monitoring locations should be as per the statutory guidelines.

5.11.4 *Noise Monitoring*

Ambient noise level monitoring shall be carried out at representative locations in the site and study area over a period of 24 h to obtain hourly equivalent continuous noise (L_{eq}) levels as well as day and night time L_{eq} to compare with the standards. Noise monitoring should be carried out at appropriate locations including one at the project site, one at the boundary of the project site and one at the nearest residential/sensitive area.

5.11.5 *Landscape, Biodiversity and Site Dereliction*

Survey shall be conducted to assess existing shrubs, trees, water sources, etc, and the variety of animal and vegetable species in the project site shall be recorded.

5.11.6 *Traffic Studies*

Traffic survey for continuous 24 h shall be carried out to measure number and type of vehicles passing on the existing main roads giving access to the project.

6 PREPARATION OF SUSTAINABILITY MANAGEMENT PLAN

A sustainability management plan shall be prepared to meet the objective of sustainability, covering various aspects reflected in this standard. The plan of shall also describe the processes, procedures and initiatives that the project will implement to meet the sustainability goals of the project. The plan shall require implementation of appropriate sustainability management techniques.

7 CONTROL OF SUSTAINABILITY MANAGEMENT PLAN

The project team shall monitor, measure, analyze, and evaluate its performance on site based upon the sustainable management plan developed above. The evaluation should include following aspects from the sustainable management plan:

a) Frequency of the assessment should be every 6 months, though, the frequency may vary based upon the complexity and size of the project.

b) Based on the assessment report, plan of action should be determined and circulated to the entire team to ensure that the process remains integrated.

c) Action items should have timelines, and a tracking mechanism shall be in place to comply with any non-compliance of the actions mentioned through the assessment reports.

Self-declaration matrix is provided at Annex A which will capture the sustainable management plan and help create a tracking mechanism for the project team.

8 LESSONS LEARNT

Lessons learnt is a summary of sustainable project management experience and process improvement recommendations. It includes information on environmental compliances, approaches, sustainable construction methodologies, energy performances and shall be documented for the improvement of the future projects.

ANNEX A

(*Clause* 6)

SUSTAINABLE MANAGEMENT PLAN MATRIX (INDICATIVE)

Sl No.	Aspects to be Checked	Sustainable Management Plan Compliance	Yes/No	No	Pending	Date of Commitment	Documents/ Photographs Verified	Reference of Documents/ Photographs Verified with Date	Observation/ Comments	Remedial Action
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
i)										
ii)										
iii)										
iv)										
v)										

ANNEX B

(*Foreword*)

COMMITTEE COMPOSITION

Construction Management (Including Safety in Construction) Sectional Committee, CED 29

Organization	*Representative(s)*
In Personal Capacity (*102, Sraddha Temple Tree, Rustom Bagh, Old Airport Road, Bengaluru*)	Shri P. Krishnan (***Chairman***)
AECOM India Pvt Ltd, Gurugram	Shri Pawan Jaipuriar Shri Arvind Agrawal (*Alternate*)
Airports Authority of India, New Delhi	Shri G. D. Gupta Shri M. N. N. Rao (*Alternate*)
Builders' Association of India, Mumbai	Shri H. S. Pasricha Shri Sanjay Soni (*Alternate*)
Central Public Works Department, New Delhi	Shri M. K. Sharma Shri Sanjeev Rastogi (*Alternate*)
Construction Industry Development Council, New Delhi	Shri P. R. Swarup Shri O. P. Gupta (*Alternate*)
Construction Skill Development Council of India, New Delhi	Shri Anand Kumar Singh Ms Jancy Mathew (*Alternate*)
Creative Design Consultants & Engineers Private Limited, Ghaziabad	Shri Aman Deep
CSIR-Central Building Research Institute, Roorkee	Dr Achal K. Mittal Dr Ajay Chaurasia (*Alternate*)
Delhi Development Authority, New Delhi	Engineer Member Chief Engineer (Design) (*Alternate*)
Delhi Metro Rail Corporation Ltd, New Delhi	Shri Pramit Kumar Garg Shri Ravi Kapoor (*Alternate*)
EH and S Cares, New Delhi	Shri A. K. Tripathi
Engineers India Limited, New Delhi	Shri Amitava Pal Shri Ravindra Kumar (*Alternate*)
GMR Infra and Airport, New Delhi	Representative
Hindustan Construction Company Ltd, Mumbai	Shri Satish Kumar Sharma Shri Avinash Harde (*Alternate* I) Ms Pooja Deshmukh (*Alternate* II)
Hindustan Prefab Limited, New Delhi	Chairman and Managing Director Shri S. K. Jain (*Alternate*)
Indian Buildings Congress, New Delhi	Shri Deepak Narayan
Indian Institute of Technology Delhi, New Delhi	Dr K. C. Iyer Dr J. Uma Maheshwari (*Alternate*)
Kaleidoscope, Noida	Shri Amor Kool
Larsen and Toubro Ltd, Chennai	Shri M. P. Naidu Shri R. Shankar Narayanan (*Alternate*)
M. N. Dastur & Company Private Limited, Kolkata	Shri Soumik Sen Shri Alakes Bhattacharyya (*Alternate* I) Shri Agni Gupta (*Alternate* II)

Organization	*Representative(s)*
Military Engineer Services, Engineer-in-Chief's Branch, Integrated HQ of MoD (Army), New Delhi	Brig M. J. Kumar Col Y. S. Dhaka (*Alternate*)
Ministry of Statistics & Programme Implementation, New Delhi	Deputy Director General (PI) Director (IPMD) (*Alternate*)
NBCC (India) Ltd, New Delhi	Shri Alok Rastogi Shri P. S. Rao (*Alternate*)
National Institute of Construction Management and Research, Mumbai	Dr Anil Agarwal Dr Arun Chandramohan (*Alternate*)
NTPC Ltd, New Delhi	Shri Anil Kapoor
NITI Ayog, New Delhi	Shri Shatrughan Lal Shri Sanjay Kumar (*Alternate*)
PMI Organization Centre Private Ltd, Mumbai	Shri Suvarna Naikdesai Shri Sesha Sai (*Alternate*)
School of Planning & Architecture, New Delhi	Dr V. K. Paul Shri Abhijit Rastogi (*Alternate*)
Shelter Consulting Engineers, Noida	Shri Manoj Kumar Mittal
STUP Consultants, Mumbai	Representative
The Institution of Engineers (India), Kolkata	Shri Bipin Chand
In personal capacity (B-31, *Manas Apartments, Mayur Vihar -1 Extension, Delhi*)	Shri V. K. Sharma
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(*Continued from second cover*)

This standard (Part 11) on sustainability management has been formulated with the purpose to provide guidelines on sustainability parameters.

The guidelines may be applicable in general to all construction projects. However, for smaller projects, the applicability of various provisions may be decided appropriately by the parties concerned.

The provisions of this standard are without prejudice to the concerned statutory provisions contained in various Acts and Rules and Regulations framed there under, including *Water (Prevention and Control of Pollution) Act*, 1794; *Air (Prevention and Control of Pollution) Act*; 1981; *The Environment (Protection) Act*, 1986; *The Public Liability (Insurance) Act*, 1991, and EIA Notification 2006 as amended from time to time.

The composition of the Committee responsible for formulation of this standard is given in Annex B.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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